

```

                                51
scnPtr = img + (S.xofsM+S.yWinM-1)*pixPerScn + xOfsM;
if (levels==8) {
    if (S.segmtMode==3) { /* directed acuity mode 3; pack pixels */
        /* S.xWinM and S.yWinM known to be mod 8 & mod 2, respectively */
        for (j=0; j<S.yWinM; j+=2, scnPtr-=2*pixPerScn) {
            pxlPtr = scnPtr;
            for (i=0; i<S.xWinM; i+=2, pxlPtr+=2) {
                bA = (int)*pxlPtr;
                bB = (int)*(pxlPtr+1);
                bC = (int)*(pxlPtr-pixPerScn);
                bD = (int)*(pxlPtr-pixPerScn+1);

                /* bit 0 is set if halftone (&1) */
                /* bit 1 is set if verticle (&2) */
                /* code for diagonals is same value in 224 and 28 locs */
                /* diagonals made only when bit d is blacker than a,b,c */
                vector = 0;
                if (bA&1) vector |= 8; /* halftone A */
                if (bB&1) vector |= 4; /* halftone B */
                if (bC&1) vector |= 2; /* halftone C */
                if (bD&1) vector |= 1; /* halftone D */
                switch (vector) {
                    case 0: if (((bD&224)<(bB&224))&&((bD&224)<(bC&224)))*/(0) {
                        byt = (bD&227) | ((bD>>3)&28); break;
                    } else {
                        byt = (bA&2)? (bA&227) | ((bB>>3)&28)
                                   : (bA&227) | ((bC>>3)&28);
                        byt = grad(byt); break;
                    }
                    case 1: byt = (bA&2)? (bA&227) | ((bB>>3)&28)
                                   : (bA&227) | ((bC>>3)&28);
                        byt = grad(byt); break;
                    case 2: byt = (bB&2)? (bA&224) | ((bB>>3)&28) | (bB&3)
                                   : (bA&224) | m28(bA) | (bB&3);
                        byt = grad(byt); break;
                    case 3: byt = (bA&2)? (bA&227) | ((bB>>3)&28)
                                   : (bA&227) | m28(bA);
                        byt = grad(byt); break;
                    case 4: byt = (bC&2)? (bA&224) | m28(bA) | (bC&3)
                                   : (bA&224) | ((bC>>3)&28) | (bC&3);
                        byt = grad(byt); break;
                    case 5: byt = (bA&2)? (bA&227) | m28(bA)
                                   : (bA&227) | ((bC>>3)&28);
                        byt = grad(byt); break;
                    case 6: byt = bA&227 | m28(bA); break;
                    case 7: byt = bA&227 | m28(bA);
                        byt = grad(byt); break;
                    case 8: if (((bD&224)<(bB&224))&&((bD&224)<(bC&224)))*/(0)
                        byt = (bD&227) | ((bD>>3)&28); break;
                    } else {
                        byt = (bD&2)? m224(bC) | ((bB>>3)&28) | (bD&3)
                                   : m224(bB) | ((bC>>3)&28) | (bD&3);
                        byt = grad(byt); break;
                    }
                    case 9: byt = (bB&2)? m224(bC) | ((bB>>3)&28) | (bB&3)
                                   : m224(bB) | ((bC>>3)&28) | (bB&3);
                        byt = grad(byt); break;
                    case 10:
                    case 11: byt = m224(bB) | ((bB>>3)&28) | (2);
                        byt = grad(byt); break;
                    case 12:
                    case 13: byt = m224(bC) | ((bC>>3)&28);

```

PENDIX A

10025671.122601

```

                    52
                    byt = grad(byt); break;
                case 14: byt = (bD&227)|((l >3)&28); break;
                case 15: byt = bA; break;
            }
            temp1 = (uch)byt;
            putc(temp1, stmPtr); /* even is linear */
        }
    } else { /* mode must be 0,1 or 2 */
        /* S.xWinM known to be mod 4 */
        for (j=0; j<S.yWinM; j++, scnPtr-=pixPerScn) {
            pxlPtr = scnPtr;
            for (i=0; i<S.xWinM; i++, pxlPtr++) {
                temp1 = *pxlPtr;
                putc(temp1, stmPtr); /* even is linear */
            }
        }
    } else { /* dont do segmentation for quants less than 8 */
        /* quantize the value, then map into a byte, 0 - 255 */
        qdb10 = (dbl)(1<<levels);
        qdb11 = (qdb10 - .000001) / 255.0;
        qdb12 = 255.0 / (qdb10-1.0);
        /* S.xWinM known to be mod 4 */
        for (j=0; j<S.yWinM; j++, scnPtr-=pixPerScn) {
            pxlPtr = scnPtr;
            for (i=0; i<S.xWinM; i++, pxlPtr++) {
                temp1 = *pxlPtr;
                if ((temp1==255)|| (temp1==0)) {
                    putc(temp1, stmPtr);
                } else {
                    qdb13 = (dbl)temp1;
                    qdb14 = (floor(qdb13*qdb11))*qdb12;
                    putc(((unsigned char)qdb14), stmPtr);
                }
            }
        }
    }
    fclose(stmPtr);
}

```

```

nt
rad(byte)
nt byte;
return byte; }

```

```

nt
rad1(byte)
nt byte;
/* returns byte with entries not equal; ie a gradient */
int b1, b2, b3, b4, b5, vector;

```

```

b1 = byte&224; b2 = (byte&28)<<3;
if ((b1==b2)) {
    return byte;
} else {
    vector = b1>>5;
    switch (vector) {
        case 7: b3=24; break; /* 224 */
        case 6: b3=28; break; /* 192 */
        case 5: b3=24; break; /* 160 */
        case 4: b3=20; break; /* 128 */
    }
}

```

```

    pxr = (pxr < 1) ? 1 : pxr;
    pxlc = ((pxlp+pxlr)/2) | 1;
    pxld = ((pxlb+pxrs)/2) | 1;
  } else { /* r is halftone */
    pxlc = pxla;
    pxld = pxlb;
  }
}
} else { /* p is halftone - generate pqrs as halftone pixels */
  pxlp = byteP&254;
  pxlq = (byteQ&1) ? pxlp : byteQ&254; /* q linear? */
  pxlr = (byteR&1) ? pxlp : byteR&254; /* r linear? */
  pxls = (byteS&1) ? pxlp : byteS&254; /* s linear? */
  pxla = pxlp;
  pxlb = ((pxlp+pxlq)/2);
  pxlc = ((pxlp+pxlr)/2);
  pxld = ((pxlp+pxlq+pxlr+pxls)/4);
}
*(srcPtr+0) = (uch)pxla;
*(srcPtr+1) = (uch)pxlb;
*(ofsPtr+0) = (uch)pxlc;
*(ofsPtr+1) = (uch)pxld;

srcPtr += 2; /* advance by one source pixel */
ofsPtr += 2; /* advance by one source pixel */
nxtPtr += 2; /* advance by one source pixel */
lstPtr += 2; /* advance by one source pixel */
}
srcPtr += xwin*2; /* advance by one more source raster */
ofsPtr += xwin*2; /* advance by one more source raster */
nxtPtr += xwin*2; /* advance by one more source raster */
lstPtr += xwin*2; /* advance by one more source raster */
}
}
}

```

10025671.122601

```

        case 3: b3=8; break; /* 96 */
        case 2: b3=4; break; /* 64 */
        case 1: b3=0; break; /* 32 */
        case 0: b3=4; break; /* 0 */
    }
    b4 = byte&3;
    b5 = b1|b3|b4;
    return b5;
}

```

nt
 .8(byte)
 nt byte;

```

        if (byte&128) return 28; else return 0;
    
```

nt
 224(byte)
 nt byte;

```

        if (byte&128) return 224; else return 0;
    
```

10025671.122601

```

if mode==3; /* _assemble das bytes into _p,q,r pixels *
srcPtr = srcStPtr;
ofsPtr = srcStPtr + xwin*2; /* offset by one raster */
nxtPtr = srcStPtr + xwin*4; /* offset by two rasters */
lstPtr = srcStPtr - xwin*4; /* offset by two rasters */
for (i=0; i<ywin; i++) {
    for (j=0; j<xwin; j++) {

```

ENDIX B

```

        byteP = *srcPtr;
        byteQ = *(srcPtr+2);
        byteR = *nxtPtr;
        byteS = *(nxtPtr+2);
        byteU = *lstPtr; /* U & V have been unpacked last raster */
        byteV = *(srcPtr-2);
        crnrP = *(lstPtr-2);
        crnrQ = *(lstPtr+2);
        crnrR = *(nxtPtr-2);
        crnrS = *(nxtPtr+2);
        dglPS = ((crnrP&1)&&(crnrS&1)); /* both PS corners lineart */
        dglQR = ((crnrQ&1)&&(crnrR&1)); /* both QR corners lineart */
        /* lsb indicates lineart; next lsb indicates horizontal */
        if (byteP&1) { /* p is lineart - gen pqrs as lineart pixels */
            tmpP = (byteP&224);
            pxlp = tmpP|(tmpP>>3);
            if ( ((byteQ&2)^(byteR&2)) /* one vert, the other horz */
                &&(byteQ&1)&&(byteR&1) /* and both sides are lineart */
                &&(byteU&1)&&(byteV&1) /* and four sides are lineart */
                &&((dglPS) || (dglQR)) ) { /* and either ps or qr lineart */
                /* if both diags lineart, replicate lowest along diag. */
                /* if only one diag lineart, replicate in dir of diag. */
                pxla = pxlp|1;
                tbot = byteP&28;
                pbot = tbot|(tbot<<3)|1;
                if ((dglPS)&&(dglQR)) { /* both diagonals lineart */
                    /* replicate the lowest */
                    if (pxla<pbot) { /* replicate a to d; b or c interpolated */
                        pxld = pxla;
                        if (byteP&2) { /* p horz; bot of p goes to c; b intrp */
                            tmpQ = (byteQ&224);
                            pxlq = tmpQ|(tmpQ>>3);
                            pxlb = ((pxlp+pxlq)/2)|1;
                            pxlc = pbot;
                        } else { /* p vert; bot of p goes to b; c intrp */
                            tmpR = (byteR&224);
                            pxlr = tmpR|(tmpR>>3);
                            pxlc = ((pxlp+pxlr)/2)|1;
                            pxlb = pbot;
                        }
                    } else { /* replicate b to c; d interpolated */
                        pxlb = pbot;
                        pxlc = pbot;
                        tmpQ = (byteQ&224);
                        pxlq = tmpQ|(tmpQ>>3);
                        tmpR = (byteR&224);
                        pxlr = tmpR|(tmpR>>3);
                        pxld = ((pxlq+pxlr)/2)|1;
                    }
                } else { /* only one diagonal PS or QR is lineart */
                    if (dglPS) { /* only diagonal PS is lineart */
                        /* replicate along PS direction */
                        pxld = pxla;
                        if (byteP&2) { /* p is horz */
                            pxlc = pbot;

```

10025571.122601

```

    } else { /* p is vert */
        pxlb = (pxlp+pxlq)/2|1;
        pxlc = ((pxlp+pxlr)/2)|1;
    }
} else { /* only diagonal QR is lineart */
    /* replicate along QR direction */
    pxlb = pbot;
    pxlc = pbot;
    tmpq = (byteQ&224);
    pxlq = tmpq|(tmpq>>3);
    tmpr = (byteR&224);
    pxlr = tmpr|(tmpr>>3);
    pxlc = ((pxlp+pxlr)/2)|1;
}
}
i=i; /* breakpoint */
} else {
    pxla = pxlp|1;
    if (byteP&2) { /* p is horz */
        tmpc = byteP&28;
        pxlc = tmpc|(tmpc<<3)|1;
        if (byteQ&1) { /* q is lineart */
            tmpq = (byteQ&224);
            pxlq = tmpq|(tmpq>>3);
            if (byteQ&2) { /* q is horz */
                tmqs = byteQ&28;
                pxqs = tmqs|(tmqs<<3);
            } else { /* q is verticle */
                if (byteS&1) { /* s is lineart */
                    tmps = (byteS&224);
                    pxls = tmps|(tmps>>3);
                    pxqs = (pxlq+pxls)/2;
                } else { /* s is halftone */
                    pxqs = pxlq;
                }
            }
            pxlb = ((pxlp+pxlq)/2)|1;
            pxld = ((pxlc+pxqs)/2)|1;
        } else { /* q is halftone */
            pxlb = pxla;
            pxld = pxlc;
        }
    }
} else { /* p is vert */
    tmpb = byteP&28;
    pxlb = tmpb|(tmpb<<3)|1;
    if (byteR&1) { /* r is lineart */
        tmpr = (byteR&224);
        pxlr = tmpr|(tmpr>>3);
        if (byteR&2) { /* r is horz */
            if (byteS&1) { /* s is lineart */
                tmps = (byteS&224);
                pxls = tmps|(tmps>>3);
                pxrs = (pxlr+pxls)/2;
            } else { /* s is halftone */
                pxrs = pxlr;
            }
        }
    } else { /* r is verticle */
        tmrs = byteR&28;
    }
}
}

```

10025671-122601

```

    pxr = (pxr << 1) | (pxr >> 1);
    pxlc = ((pxlp+pxlr)/2)|1;
    pxld = ((pxlb+pxrs)/2)|1;
} else { /* r is halftone */
    pxlc = pxla;
    pxld = pxlb;
}
}
} else { /* p is halftone - generate pqrs as halftone pixels */
    pxlp = byteP&254;
    pxlq = (byteQ&1)? pxlp : byteQ&254; /* q lineart? */
    pxlr = (byteR&1)? pxlp : byteR&254; /* r lineart? */
    pxls = (byteS&1)? pxlp : byteS&254; /* s lineart? */
    pxla = pxlp;
    pxlb = ((pxlp+pxlq)/2);
    pxlc = ((pxlp+pxlr)/2);
    pxld = ((pxlp+pxlq+pxlr+pxls)/4);
}
*(srcPtr+0) = (uch)pxla;
*(srcPtr+1) = (uch)pxlb;
*(ofsPtr+0) = (uch)pxlc;
*(ofsPtr+1) = (uch)pxld;

srcPtr += 2; /* advance by one source pixel */
ofsPtr += 2; /* advance by one source pixel */
nxtPtr += 2; /* advance by one source pixel */
lstPtr += 2; /* advance by one source pixel */
}
srcPtr += xwin*2; /* advance by one more source raster */
ofsPtr += xwin*2; /* advance by one more source raster */
nxtPtr += xwin*2; /* advance by one more source raster */
lstPtr += xwin*2; /* advance by one more source raster */
}
}
}

```

10025671.122601